



UNITED STATES PATENT AND TRADEMARK OFFICE

ce

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/710,399	07/08/2004	Min-Jer Lin	LKSP0027USA	4398
27765 7590 05/15/2007 NORTH AMERICA INTELLECTUAL PROPERTY CORPORATION P.O. BOX 506 MERRIFIELD, VA 22116			EXAMINER NGUYEN, DAO H	
			ART UNIT	PAPER NUMBER
			2818	
			NOTIFICATION DATE	DELIVERY MODE
			05/15/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

winstonhsu.uspto@gmail.com
Patent.admin.uspto.Rcv@naipo.com
mis.ap.uspto@naipo.com.tw

Office Action Summary

Application No.

10/710,399

Applicant(s)

LIN, MIN-JER

Examiner

Dao H. Nguyen

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 March 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-12 and 26-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-12 and 26-37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. In response to the communications dated 03/14/2007, claims 1, 3-12, and 26-37 are active in this application.

Claim(s) 2 and 13-25 have been cancelled.

Claim Objections

2. The claim is objected to for the following reason: Claim 3 depends on cancelled claim 2. Appropriate correction to redirect the dependency of claim 3 is required.

Remarks

3. Applicant's argument(s), filed 03/14/2007, have been fully considered, but are not persuasive.

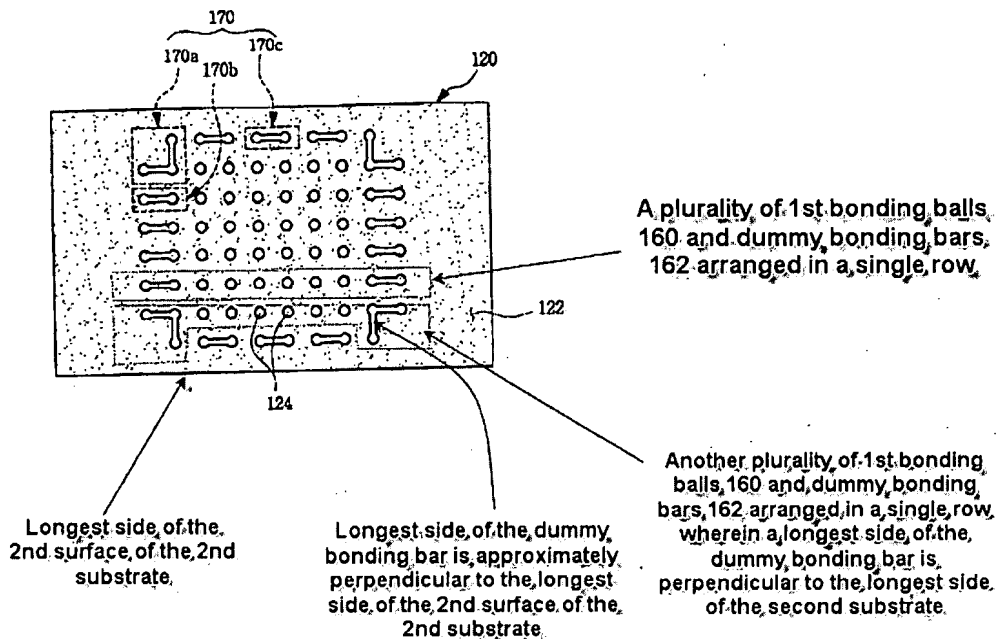
Particularly, Byun does disclose a semiconductor package comprising a plurality of bonding balls 160 and dummy bonding bar(s) 162 arranged in a single row (see attached figure below). Byun does not necessarily disclose the dummy bonding bar(s) 162 having rectangular shape; nevertheless, one of ordinary skills in the art would have recognized that the dummy bonding bar(s) 162 of Byun would have performed the same and/or equal function - that is to prevent the semiconductor package from inclining to one side (see col. 4, lines 9-26 and the remarks in the Office Action mailed 06/09/2006)

Art Unit: 2818

- in either a "dumbbell shape" or a rectangular shape. It has been held that where the only difference between the prior art and the claims was a recitation of relative dimensions or shape of the claimed device, and a device having the claimed relative dimensions or shape would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device (MPEP §2144.04). It would have been obvious that a mere change in shape of a component is generally recognized as being within the level of ordinary skill in the art.

Besides, though the bonding balls of Byun's invention are arranged in a rectangular array having at least two parallel rows, nowhere in the instant claimed invention states difference. Particularly, the instant claimed invention only recites that the first plurality of bonding balls and the dummy bonding bar are arranged in a single row, while arrangement/configuration of other possible bonding balls/bars are chosen not to describe, or are chosen to describe as being interlaced with the first bonding balls (claims 7, 32), which could also be in a rectangular array (as that taught by Byun).

FIG. 5



Claim Rejections - 35 U.S.C. § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim(s) 1, 3-12 and 26-37 are rejected under 35 U.S.C. 103 (a) as being unpatentable over U.S. Patent No. 6,736,306 to Byun et al.

Art Unit: 2818

Regarding claim 1, Byun discloses a semiconductor package, as shown in figs. 1-8, which is positioned on a first substrate 150 comprising:

a second substrate 120 having a first (upper) surface and a second (lower) surface, wherein the second surface of the second substrate has a rectangular shape;

a chip 110 positioned on the first (upper) surface of the second substrate 120;

a plurality of first bonding balls 160 positioned on the second (lower) surface of the second substrate 120 and arranged in a single row (see the attached figure above) along a first direction for connecting the second substrate 120 to the first substrate 150, wherein the first direction is parallel to a long side of the second surface; and

at least a bonding bar 162 positioned on the second surface of the second substrate 120 for connecting the second substrate 120 to the first substrate 150 and preventing the semiconductor package from inclining to one side (the bonding bar or connection terminal 162 is large, thereby improving the join force between the first substrate 150 and the second substrate 120, thereby improving the solder joint reliability of the surface mount package (col. 4, lines 9-26); therefore, it is inherently preventing the package from inclining to one side)), wherein the bonding bar 162 and the first bonding balls 160 are arranged in the single row (figs. 4, 5). See also the above remarks.

Byun does not teach that the bonding bar 162 being a dummy bar.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made that the fact that a bonding bar being an active bar or a

Art Unit: 2818

dummy bar merely depends on how the device being connected or used.

Conventionally, similar bar or ball (which has smaller size) being used as dummy bar or ball (col. 4, lines 2-3). Therefore, such "dummy" limitation has no patentable weight since it makes no structural difference in the device.

Byun does not necessarily disclose the dummy bonding bar(s) 162 having rectangular shape; nevertheless, one of ordinary skills in the art would have recognized that the dummy bonding bar(s) 162 of Byun would have performed the same and/or equal function - that is to prevent the semiconductor package from inclining to one side (see col. 4, lines 9-26 and the remarks in the Office Action mailed 06/09/2006) - in either a "dumbbell shape" or a rectangular shape. It has been held that where the only difference between the prior art and the claims was a recitation of relative dimensions or shape of the claimed device, and a device having the claimed relative dimensions or shape would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device (MPEP §2144.04). It would have been obvious that a mere change in shape of a component is generally recognized as being within the level of ordinary skill in the art.

Regarding claim 26, Byun discloses a semiconductor package, as shown in figs. 1-8, which is positioned on a first substrate 150 comprising:

- a second substrate 120 having a first (upper) surface and a second (lower) surface;

- a chip 110 positioned on the first (upper) surface of the second substrate 120;

Art Unit: 2818

a plurality of first bonding balls 160 positioned on the second (lower) surface of the second substrate 120 and arranged in a single row along a first direction for connecting the second substrate 120 to the first substrate 150; and

at least a bonding bar 162 positioned on the second surface of the second substrate 120 and arranged in the single row with the first bonding balls 160 (see the attached figure above) for connecting the second substrate 120 to the first substrate 150 and preventing the semiconductor package with the single row of the first bonding balls 160 and the bonding bar 162 from inclining to one side (the bonding bar or connection terminal 162 is large, thereby improving the join force between the first substrate 150 and the second substrate 120, thereby improving the solder joint reliability of the surface mount package (col. 4, lines 9-26); therefore, it is inherently preventing the package from inclining to one side)), wherein the bonding bar 162 and the first bonding balls 160 are arranged in the single row (figs. 4, 5). See also the above remarks.

Byun does not teach that the bonding bar 162 being a dummy bar.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made that the fact that a bonding bar being an active bar or a dummy bar merely depends on how the device being connected or used.

Conventionally, similar bar or ball (which has smaller size) being used as dummy bar or ball (col. 4, lines 2-3). Therefore, such "dummy" limitation has no patentable weight since it makes no structural difference in the device.

Regarding claims 3 and 28, Byun discloses the semiconductor package wherein the longest side of the dummy bonding bar 170a is approximately perpendicular to the long side of the second surface for preventing the semiconductor package from inclining. See fig. 5.

Regarding claims 4 and 29, Byun does not teach that a length of a short side of the second surface is less than 1000 μm . However, it would have been obvious to one of ordinary skills in the art that the short side of the second substrate 120 can be modified to have any suitable length, depending on the desired device, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955).

Regarding claims 5 and 30, Byun discloses the semiconductor package wherein the dummy bonding bar has a planar third surface connected to the first substrate for preventing the semiconductor package from inclining. See fig. 4. Note that the bonding bar or connection terminal 162 is large, thereby improving the join force between the first substrate 150 and the second substrate 120, thereby improving the solder joint reliability of the surface mount package (col. 4, lines 9-26); therefore, it is inherently preventing the package from inclining to one side).

Regarding claims 6 and 31, Byun discloses the semiconductor package further comprising a plurality of first bonding pads 124, each of which being positioned between the second surface and each of the first bonding balls 160, and at least a dummy bonding pad 174 positioned between the second surface and the dummy bonding bar 162. See fig. 6.

Regarding claims 7 and 32, Byun discloses the semiconductor package further comprising a plurality of second bonding pads positioned on the second surface and a plurality of second bonding balls respectively positioned on the second bonding pads, the second bonding balls being interlaced with the first bonding balls. See figs. 4, 6.

Regarding claims 8 and 33, Byun discloses the semiconductor package wherein a height of the dummy bonding bar is the same as a height of each of the first bonding balls and the second bonding balls. See figs. 4, 6.

Regarding claims 9-10 and 34-35, Byun does not necessarily discuss about the materials being used for the balls, the bar, and/or the pad. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to select any suitable and known material(s) for such elements, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Regarding claims 11 and 36, Byun discloses the semiconductor package wherein the first substrate 150 comprises a build-up printed circuit board, a co-fired ceramic substrate, a thin-film deposited substrate, or a glass substrate. See col. 3, lines 20-65.

Regarding claims 12 and 37, Byun does not explicitly teach that the chip is an image sensor chip. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made that any known chip, including an image sensor chip, can be used in the device of Byun, because none of such would make any change in the spirit and/or scope of the invention of Byun.

Regarding claim 27, Byun discloses the semiconductor package wherein the second surface has a rectangular shape, and the first direction is parallel to a long side of the second surface. See figs. 4, 5.

Conclusion

6. **THIS ACTION IS MADE FINAL.** A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date

Art Unit: 2818

the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dao Nguyen whose telephone number is (571)272-1791. The examiner can normally be reached on Monday-Friday 9:00am - 6:00pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith, can be reached on (571)272-1907. The fax numbers for all communication(s) is (571)273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571)272-1625.

A handwritten signature in black ink, appearing to read 'Dao', with a long horizontal line extending to the right.

Dao H. Nguyen
Art Unit 2818
May 4, 2007

A handwritten signature in black ink, appearing to read 'Andy Hung', with a long horizontal line extending to the right.

Andy Hung
Primary Examiner